TEST REPORT

No. I17Z61374-WMD06

for

Reliance Communications, LLC

GSM/CDMA/WCDMA/LTE mobile phone

Model Name: RC555L

FCC ID: 2AGBH-RC555L

with

Hardware Version: V2.0

Software Version: Orbic-RC555L-V1.6.3

Issued Date: 2017-10-17

TESTING
NVLAP LAB CODE 600118-0

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

Test Firm Designation Number:CN5017

CTTL, Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I17Z61374-WMD06	Rev.0	1st edition	2017-09-26
I17Z61374-WMD06	Rev.0	Add FCC list No.	2017-10-17

CONTENTS

1. Test Laboratory

1.1. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Location 2: CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2017-08-17

Testing End Date: 2017-09-26

1.4. Signature

Shen Yi

(Prepared this test report)

Zhou Yu

(Reviewed this test report)

Zhao Hui Lin

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Reliance Communications, LLC
Address /Post:	555 Wireless BLVD, Hauppauge NY 11788
Contact:	Saqib Ghouri /Chandler Chen
Email:	saqib.ghouri@reliance.us/chandler.chen@reliance.us
Telephone:	+92-317-512-6111/+86 185-7557-6433
Fax:	\

2.2. Manufacturer Information

Company Name:	Unimaxcomm
Address /Post:	Room 602, Building-B, Shenzhen Software Park T3, Hi-Tech Park South, Nan Shan District, Shenzhen, China
Contact:	Chunli.He
Email:	hchunli@unimaxcomm.com
Telephone:	130 7785 5257
Fax:	\

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	GSM/CDMA/WCDMA/LTE mobile phone
Model Name	RC555L
FCC ID	2AGBH-RC555L
Antenna	Integrated
Extreme vol. Limits	3.6VDC to 4.3VDC (nominal: 3.8VDC)
Extreme temp. Tolerance	-10°C to +40°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT08a	358924080002271	V2.0	Orbic-RC555L-V1.6.3	2017-08-17

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	Battery	/
AE2	Normal Charger	/

AE1

Model	RC555L
Manufacturer	Veken
Capacitance	3000mAh
Nominal Voltage	3.8V

AE2

Model	RC555L
Manufacturer	BLJ

*AE ID: is used to identify the test sample in the lab internally.

3.4. Normal Accessory setting

Fully charged battery was used during the test.

3.5. General Description

The Equipment Under Test (EUT) is a model of GSM/CDMA/WCDMA/LTE mobile phone with integrated antenna. Manual and specifications of the EUT were provided to fulfil the test.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 90	PRIVATE LAND MOBILE RADIO SERVICES	10-1-16 Edition
ANSI/TIA-603-D	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2015
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v02r02

5. SUMMARY OF TEST RESULTS

5.1. Summary of test results

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report

LTE Band 26

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	90.635	A.1	P
2	Emission Limit	2.1053/90.691	A.2	P
3	Frequency Stability	2.1055/90.213	A.3	P
4	Occupied Bandwidth	2.1049	A.4	P
5	Emission Bandwidth	90.1215	A.5	P
6	Conducted Spurious Emission	90.691	A.6	P

5.2. Statements

The test cases listed in section 6.1 of this report for the EUT specified in section 3 were performed by CTTL according to the standards or reference documents in section 4.1

The EUT met all applicable requirements of the standards or reference documents in section 4.1.

This report only deals with the LTE functions among the features described in section 3.

6. Test Equipments Utilized

NO.	Description	TYPE	series number	MANUFACTURE	CAL DUE DATE	Calibration interval
1	Universal Radio Communication Tester	CMW500	159082	R&S	2017-12-06	1 year
2	Spectrum Analyzer	FSU26	200030	R&S	2018-06-20	1 year
3	Climate chamber	SH-241	92007454	ESPEC	2017-12-14	2 year

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: 90.635.

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

This result contains peak output power and ERP/EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

The power was measured with spectrum analyzer's RMS detector.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

A.1.2.2 Measurement result

LTE band 26

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	823.3	23.70	22.88
		819.0	23.52	22.53
		814.7	23.71	22.62
	1 RB low	823.3	23.72	22.88
		819.0	23.32	22.67
		814.7	23.44	22.49
	50% RB mid	823.3	23.77	23.02
		819.0	23.59	22.29
		814.7	23.89	23.01
	100% RB	823.3	22.81	21.75
		819.0	22.41	21.43
		814.7	22.93	21.89
3MHz	1 RB high	822.5	23.17	22.33
		819.0	23.36	22.15
		815.5	23.52	22.67
	1 RB low	822.5	23.36	22.44
		819.0	23.39	22.27
		815.5	23.59	22.56
	50% RB mid	822.5	22.52	21.39

		819.0	22.50	21.48
		815.5	22.70	21.88
	100% RB	822.5	22.47	21.45
		819.0	22.46	21.35
		815.5	22.63	21.61
5MHz	1 RB high	821.5	23.40	22.53
		819.0	23.46	22.86
		816.5	23.34	22.36
	1 RB low	821.5	23.16	22.06
		819.0	23.49	22.81
		816.5	23.53	22.58
	50% RB mid	821.5	22.47	21.55
		819.0	22.49	21.46
		816.5	22.61	21.71
	100% RB	821.5	22.59	21.58
		819.0	22.42	21.50
		816.5	22.53	21.62
10MHz	1 RB high	819.0	23.52	22.73
	1 RB low	819.0	23.38	22.98
	50% RB mid	819.0	22.56	21.59
	100% RB	819.0	22.54	21.60

Note: Expanded measurement uncertainty is U = 0.83 dB, k = 2.

A.2 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 90.213.

A.2.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 26, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -10℃ to +40℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +40℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 ℃ increments from +40℃ to -10℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

A.2.2 Measurement Limit

A.2.2.1 For Hand carried battery powered equipment

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.3VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

A.2.2.2 For equipment powered by primary supply voltage

For Part 90.213, the frequency stability of the transmitter shall be maintained within ±2.5ppm of the center frequency. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

A.2.3 Measurement results

LTE Band 26, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.6	5	6	0.006	0.007
3.8	5	6	0.006	0.007
4.3	5	6	0.006	0.007

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
40°	4	5	0.005	0.006
30°	4	5	0.005	0.006
20°	4	5	0.005	0.006
10°	4	5	0.005	0.006
0°	4	5	0.005	0.006
- 10°	4	5	0.005	0.007

Expanded measurement uncertainty for this test item is 10 Hz, k = 2.

A.3 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h)(i)

A.3.1 Occupied Bandwidth Results

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from KDB 971168:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

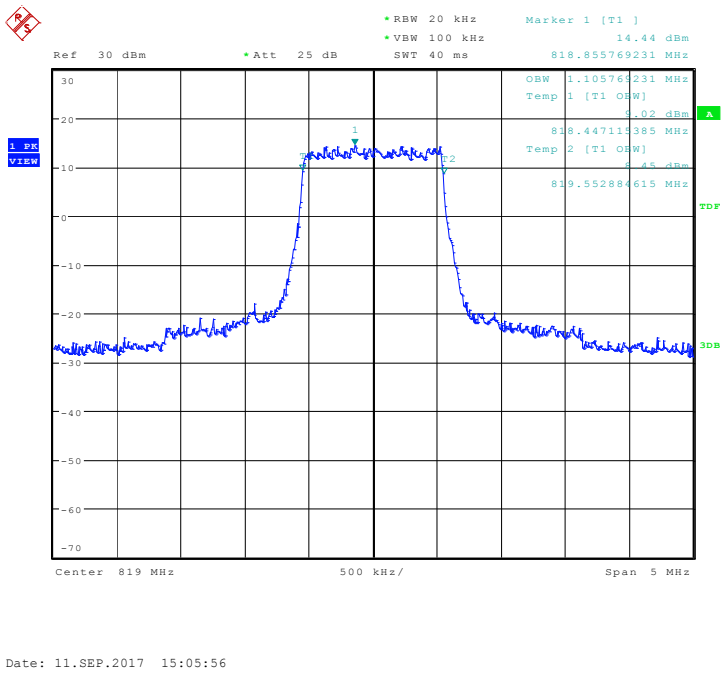
d) Set the detection mode to peak, and the trace mode to max hold.

e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

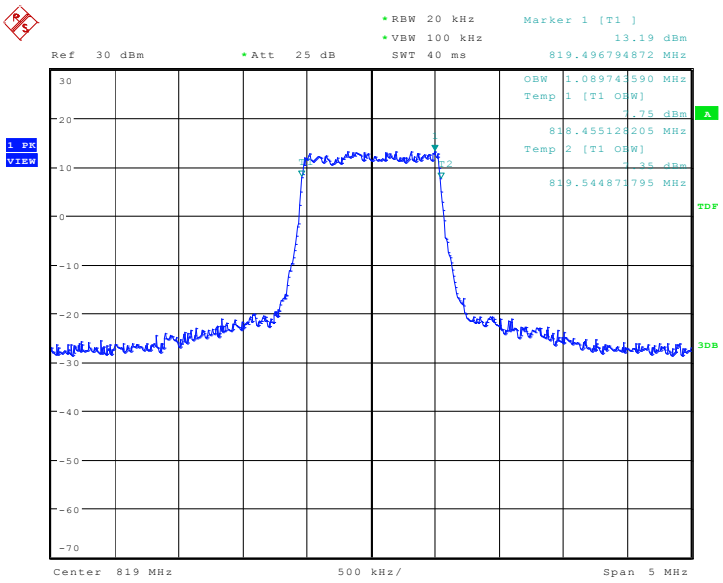
LTE band 26, 1.4MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
819.0	QPSK	16QAM
	1105.77	1089.74

LTE band 26, 1.4MHz Bandwidth, QPSK (99% BW)



LTE band 26, 1.4MHz Bandwidth, 16QAM (99% BW)

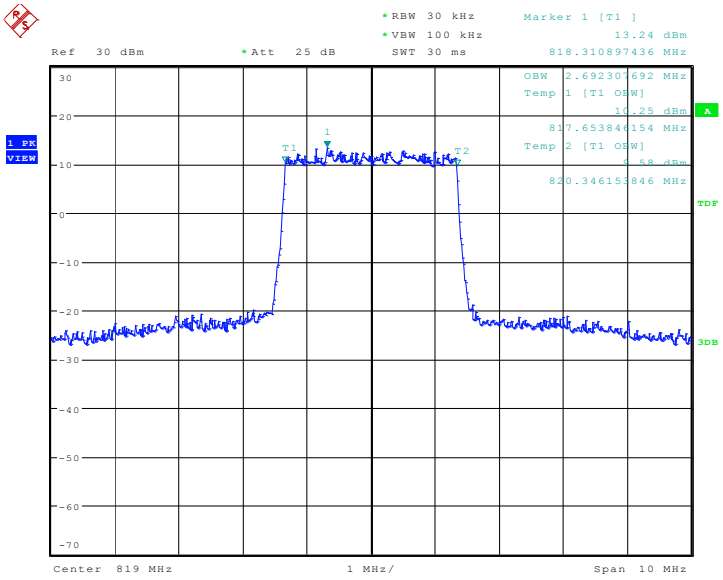


Date: 11.SEP.2017 15:06:11

LTE band 26, 3MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
819.0	QPSK	16QAM
	2692.31	2692.31

LTE band 26, 3MHz Bandwidth, QPSK (99% BW)



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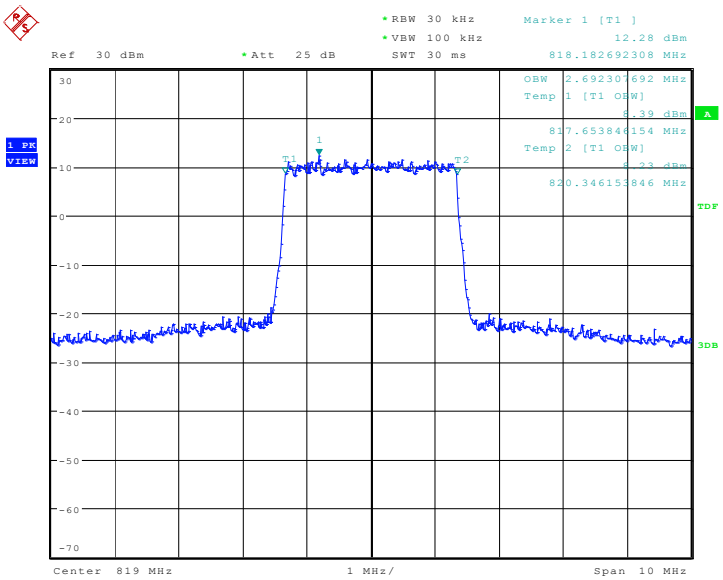
LTE band 26, 3MHz Bandwidth, 16QAM (99% BW)

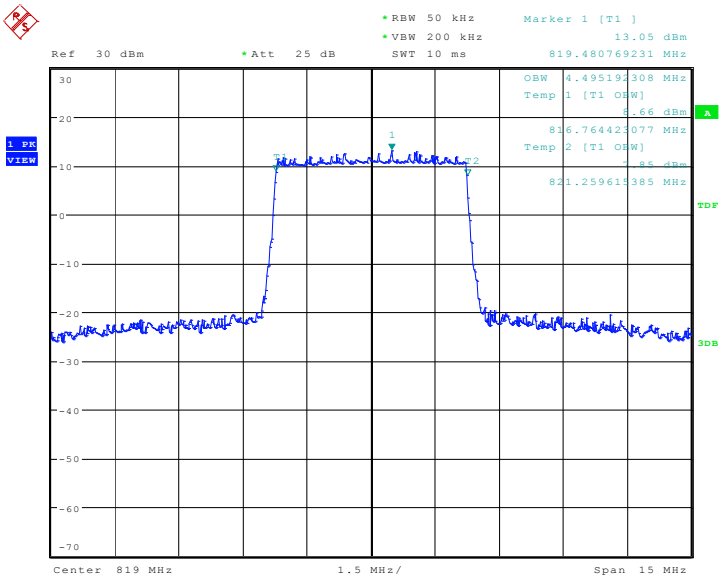


Date: 11.SEP.2017 15:13:01

LTE band 26, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
819.0	QPSK	16QAM
	4495.19	4471.15

LTE band 26, 5MHz Bandwidth, QPSK (99% BW)



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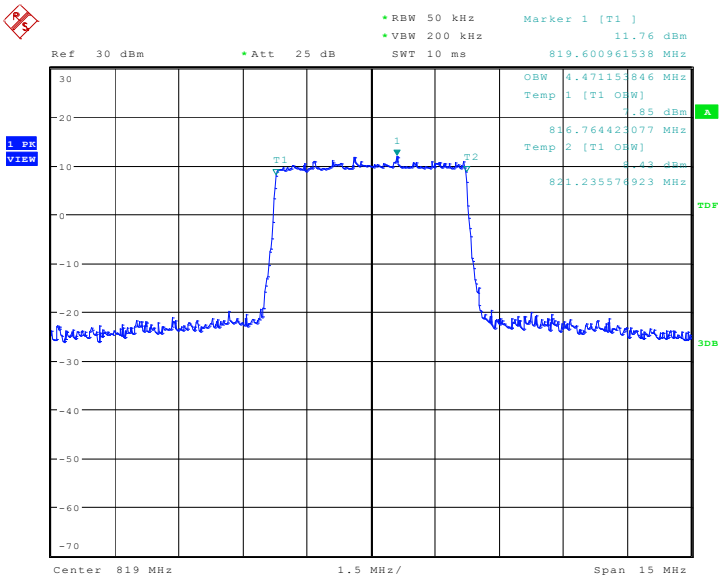
LTE band 26, 5MHz Bandwidth,16QAM (99% BW)

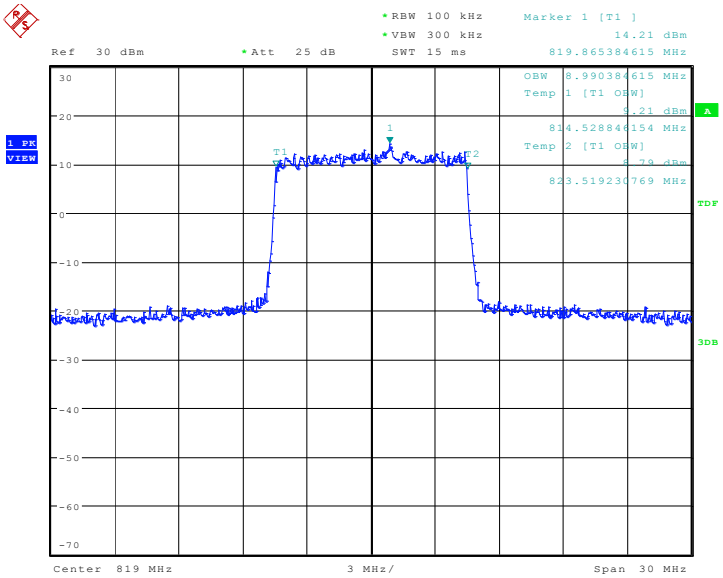


Date: 11.SEP.2017 15:19:52

LTE band 26, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
819.0	QPSK	16QAM
	8990.38	8990.38

LTE band 26, 10MHz Bandwidth, QPSK (99% BW)



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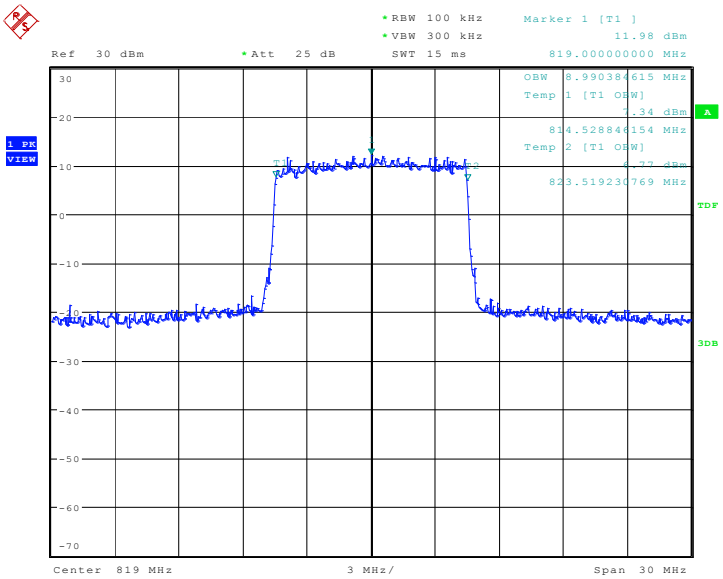
LTE band 26, 10MHz Bandwidth, 16QAM (99% BW)



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A.4 EMISSION BANDWIDTH

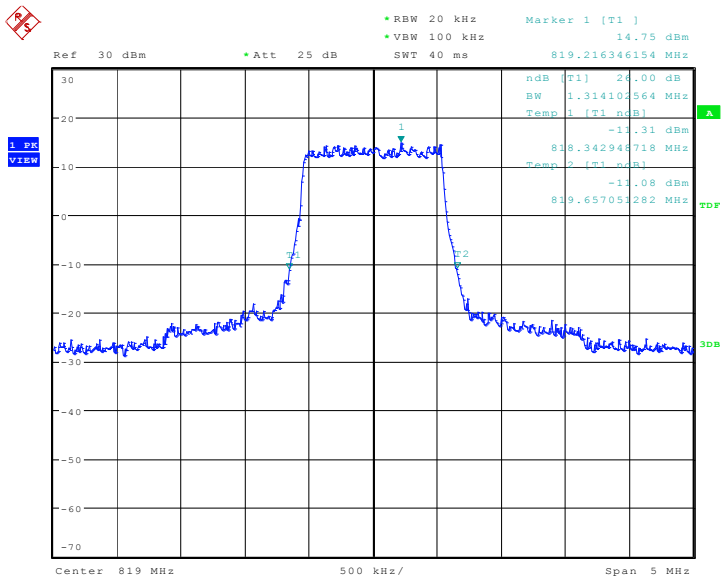
A.4.1Emission Bandwidth Results

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

LTE band 26, 1.4MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
819.0	QPSK	16QAM
	1314.10	1298.08

LTE band 26, 1.4MHz Bandwidth, QPSK (-26dBc BW)



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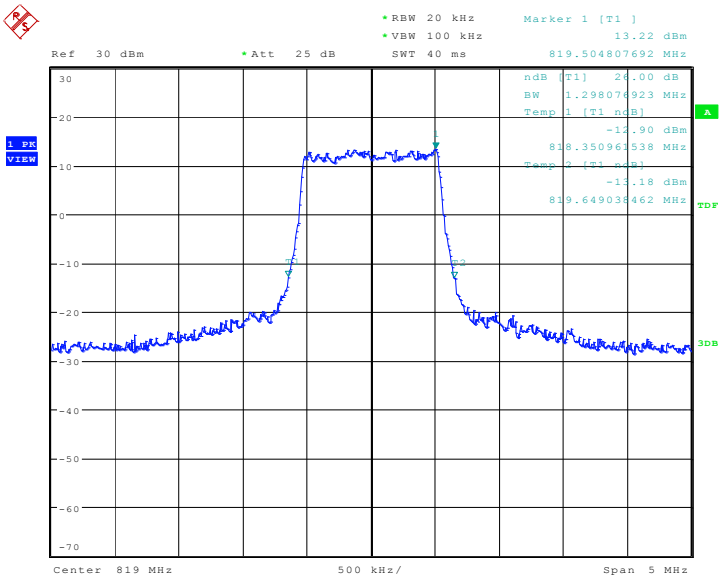
LTE band 26, 1.4MHz Bandwidth, 16QAM (-26dBc BW)



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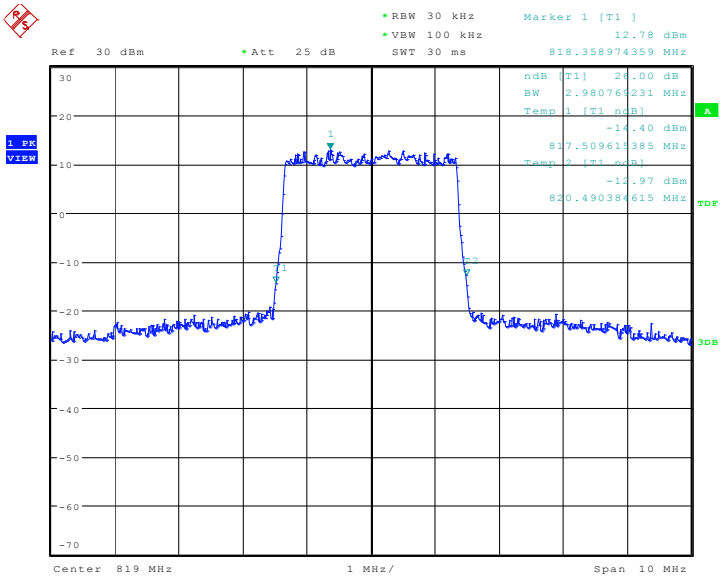
LTE band 26, 3MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
819.0	QPSK	16QAM
	2980.77	2964.74

LTE band 26, 3MHz Bandwidth, QPSK (-26dBc BW)



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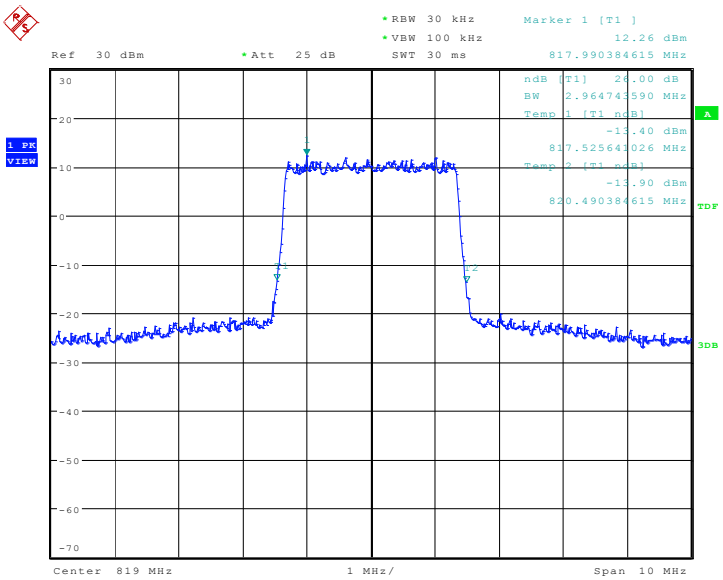
LTE band 26, 3MHz Bandwidth, 16QAM (-26dBc BW)



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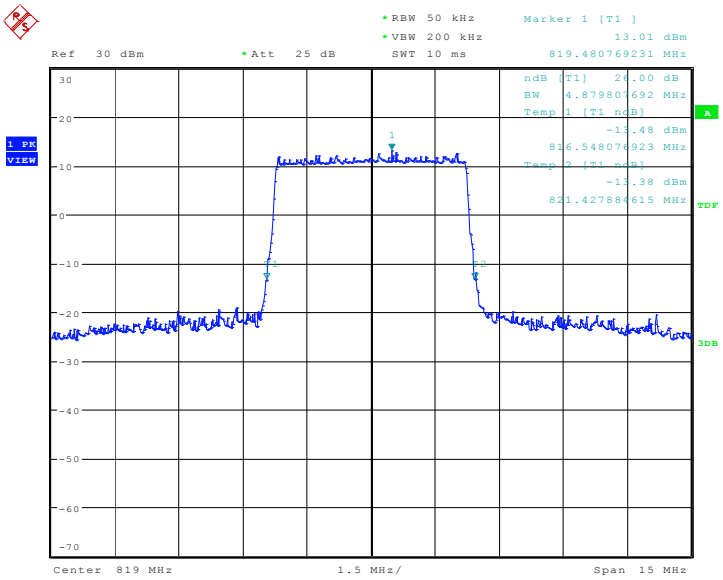
LTE band 26, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
819.0	QPSK	16QAM
	4879.81	4927.88

LTE band 26, 5MHz Bandwidth, QPSK (-26dBc BW)



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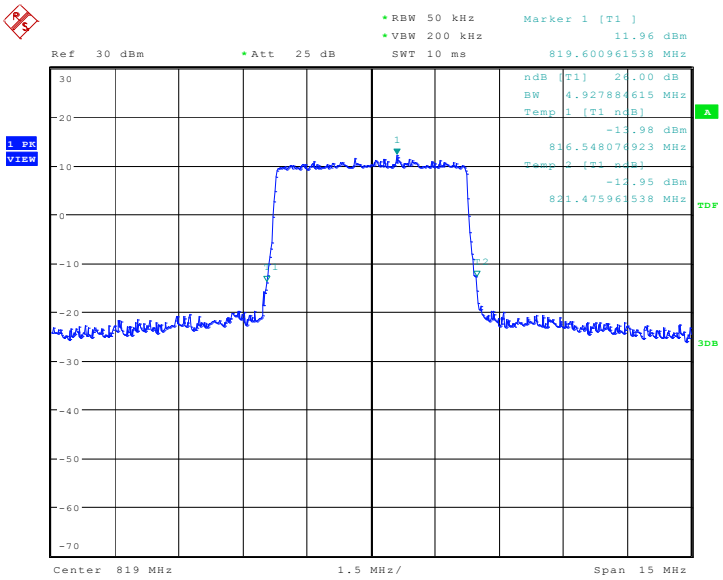
LTE band 26, 5MHz Bandwidth,16QAM (-26dBc BW)



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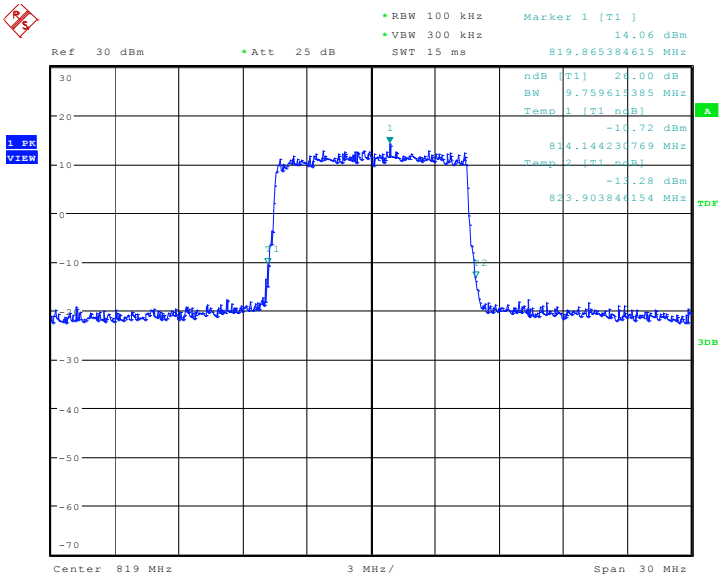
LTE band 26, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
819.0	9759.62	9759.62

LTE band 26, 10MHz Bandwidth, QPSK (-26dBc BW)



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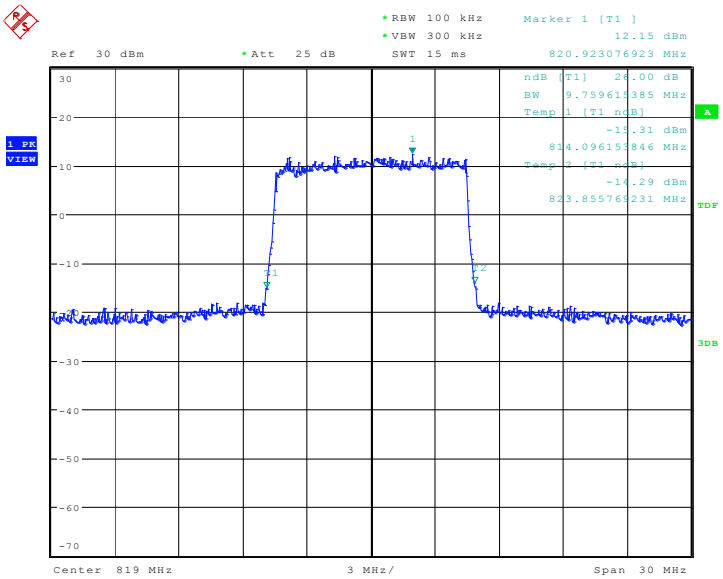
LTE band 26, 10MHz Bandwidth, 16QAM (-26dBc BW)



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A.5 CONDUCTED SPURIOUS EMISSION

A.5.1 Measurement Method

The spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. Data taken from 30 MHz to 10GHz.

Out-of-band emission requirement shall apply only to the ‘‘outer’’ channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

For any frequency removed from the EA licensee’s frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116\text{Log}_{10}(f/6.1)$ decibels or $50 + 10\ \text{Log}_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

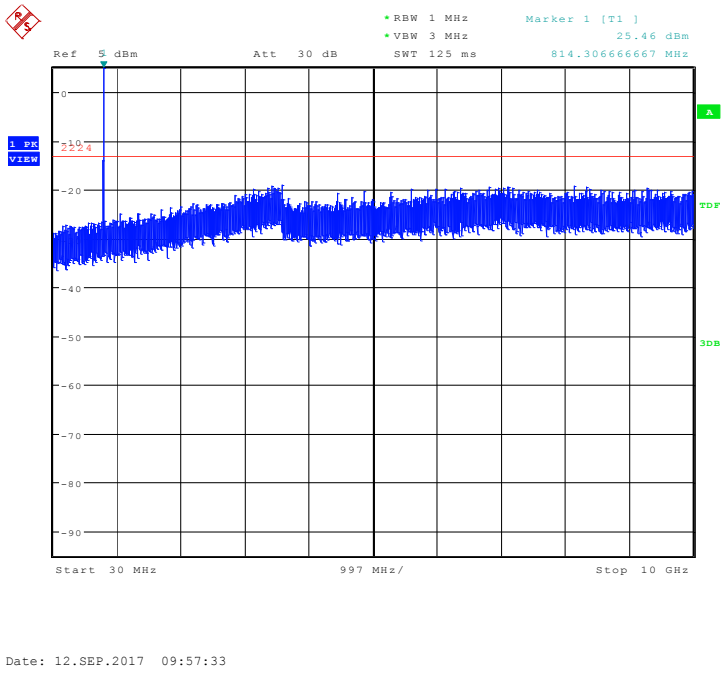
For any frequency removed from the EA licensee’s frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10\text{Log}_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

A.5.2 Measurement result

Only worst case result is given below

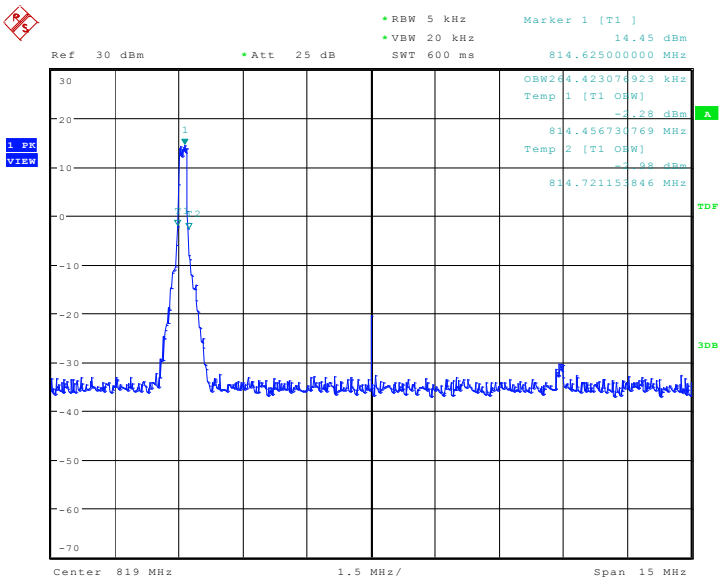
LTE band 26: 30MHz – 10GHz

Spurious emission limit –13dBm.



LTE band 26

OBW: 1RB-low_offset



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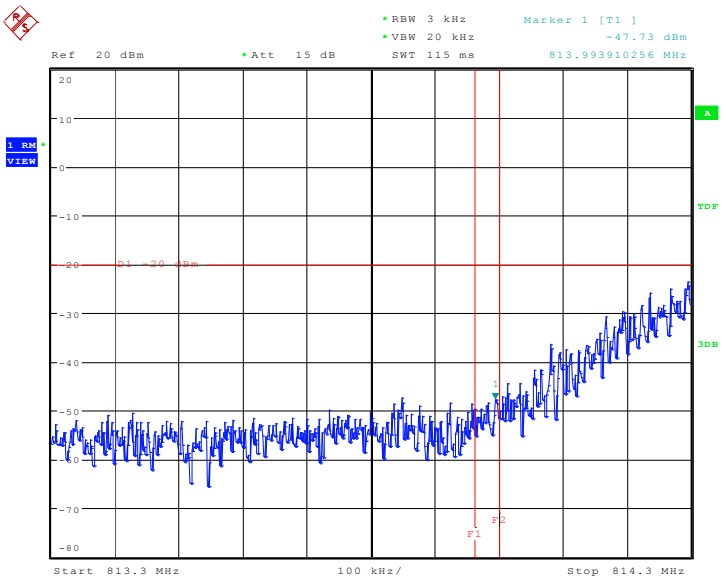
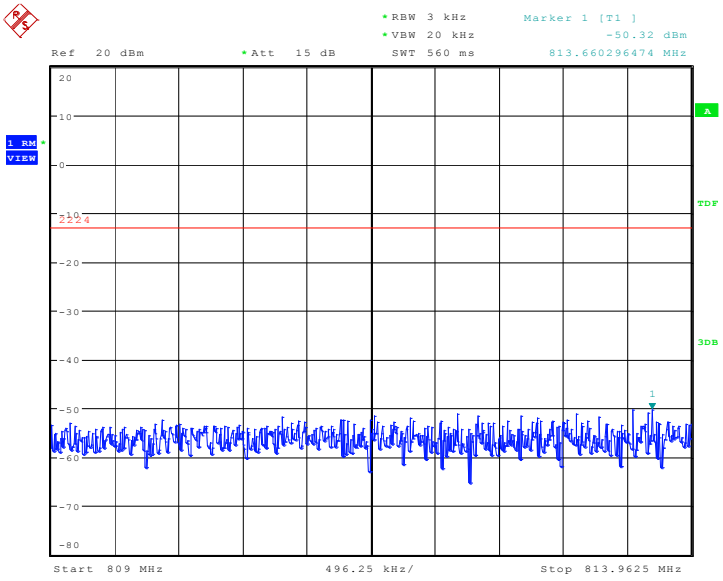
LOW Emission Mask -1RB-low_offset



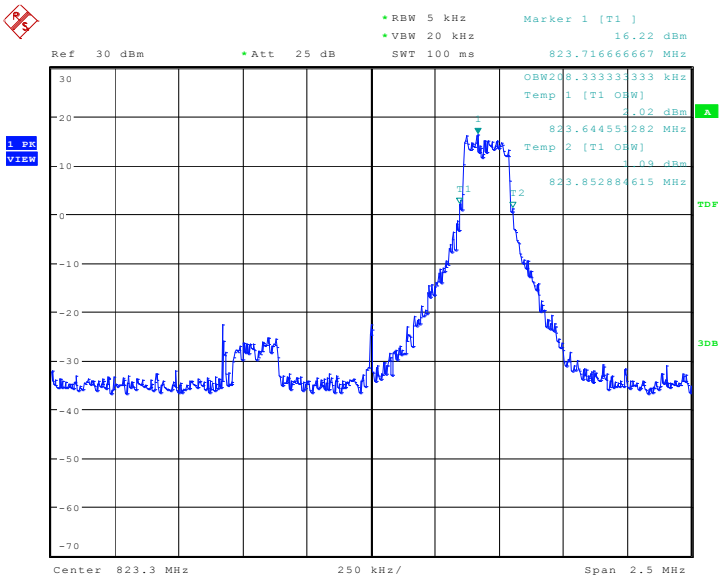
Date: 12.SEP.2017 10:05:35

LOW BAND EDGE BLOCK-1RB-low_offset



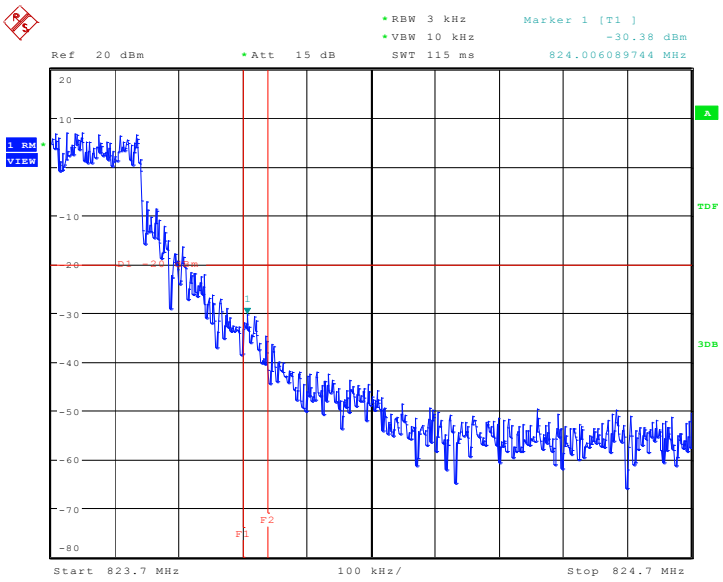
Date: 12.SEP.2017 10:05:40

OBW: 1RB-high_offset



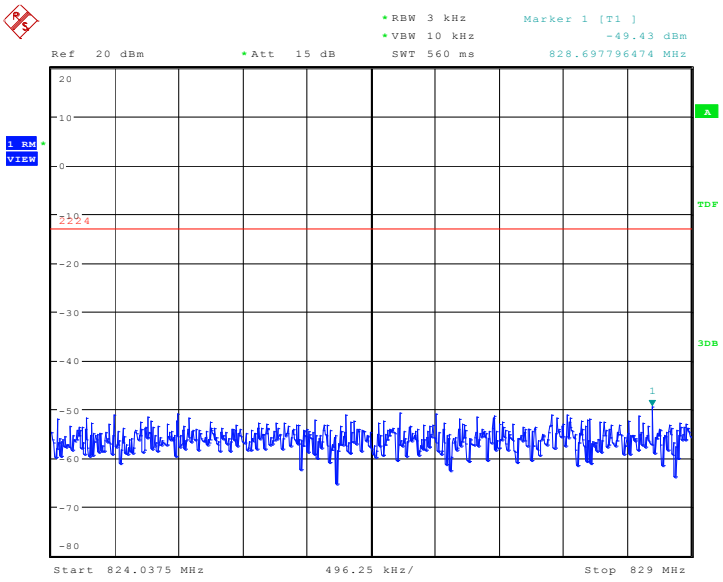
Date: 12.SEP.2017 10:08:34

HIGH Emission Mask -1RB-high_offset



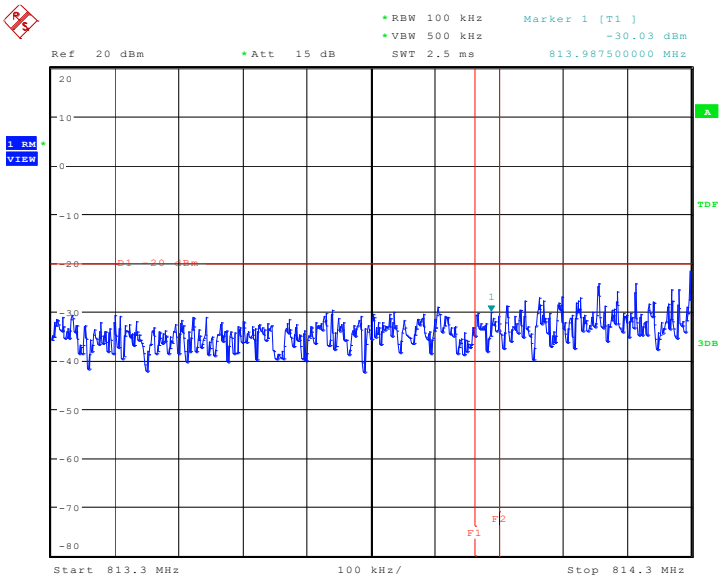
Date: 12.SEP.2017 10:09:17

HIGH BAND EDGE BLOCK-1RB-high_offset



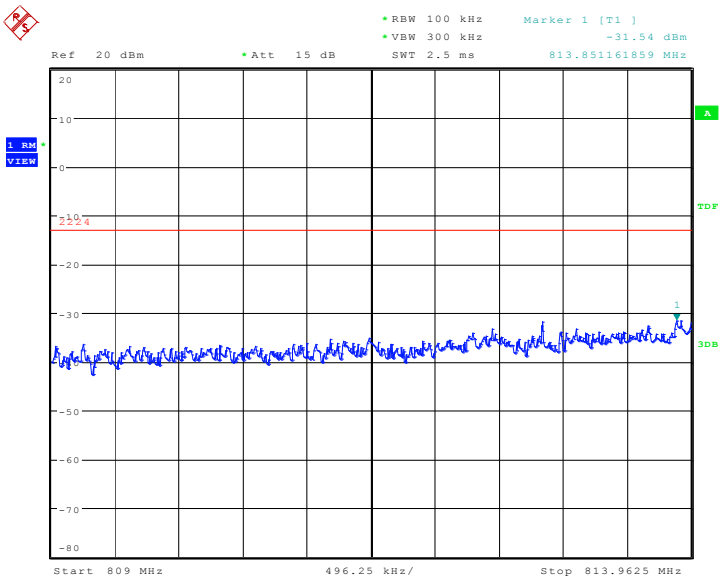
Date: 12.SEP.2017 10:09:21

LOW Emission Mask -10MHz-100%RB



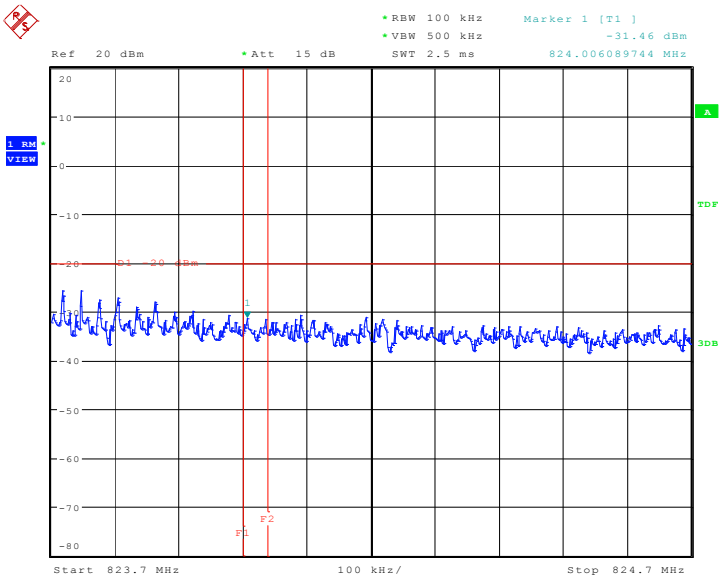
Date: 14.SEP.2017 13:18:39

LOW BAND EDGE BLOCK-10MHz-100%RB



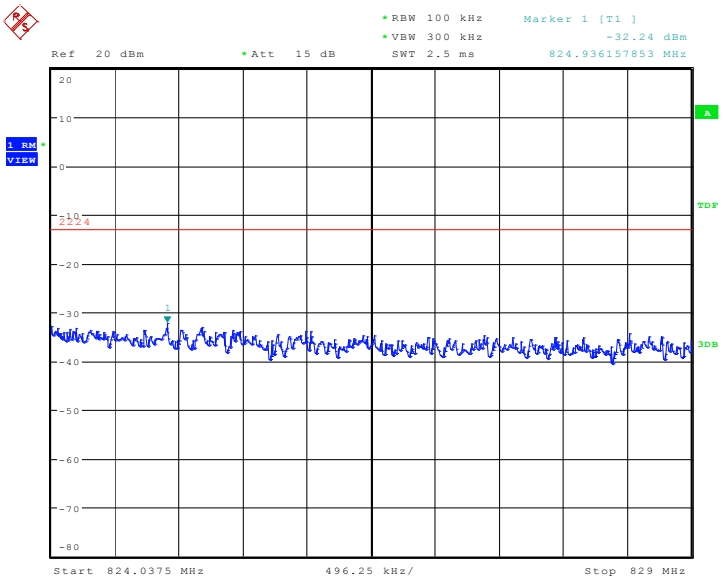
Date: 14.SEP.2017 13:18:43

HIGH Emission Mask -10MHz-100%RB



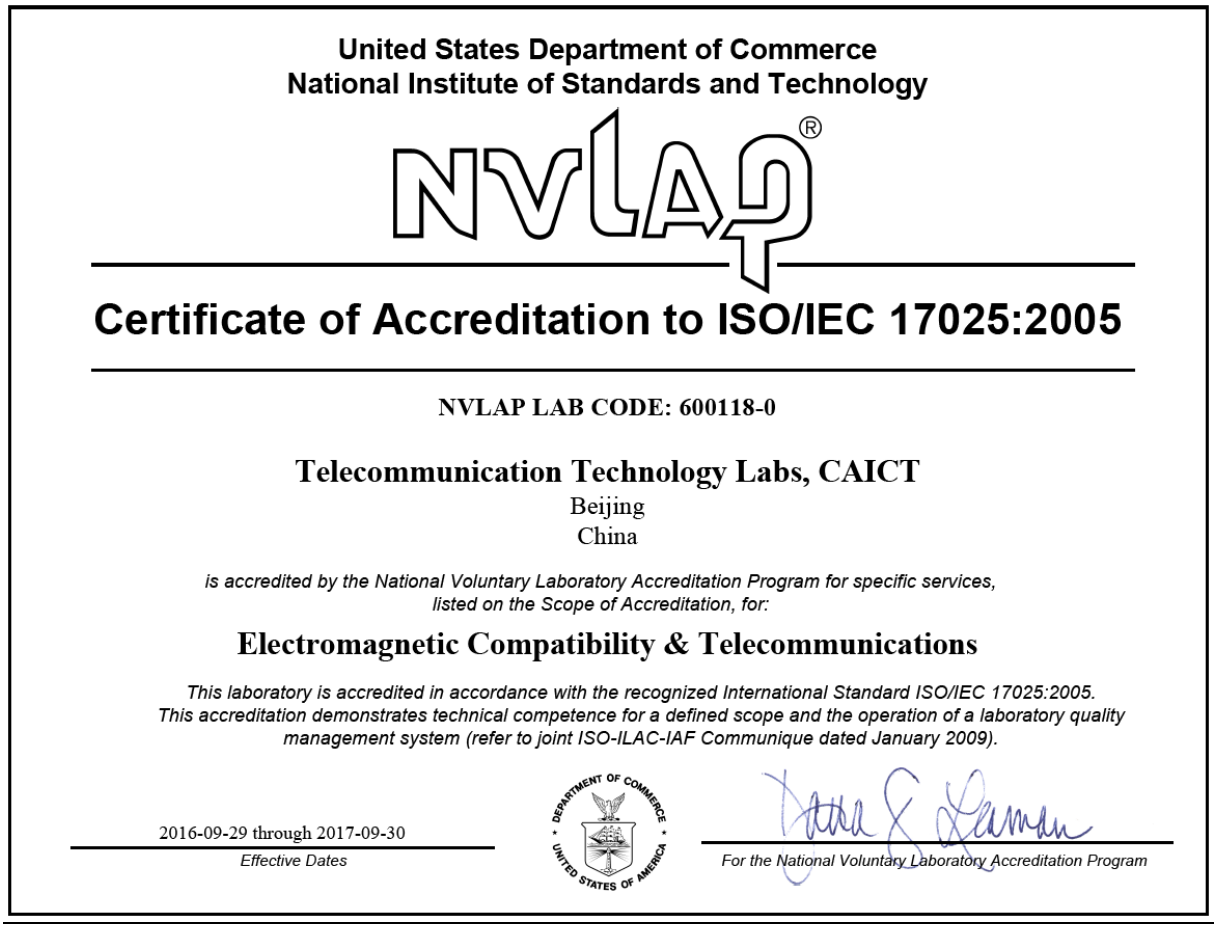
Date: 14.SEP.2017 13:19:27

HIGH BAND EDGE BLOCK-10MHz-100%RB



Date: 14.SEP.2017 13:19:31

ANNEX B: Accreditation Certificate



United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2016-09-29 through 2017-09-30
Effective Dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Voluntary Laboratory Accreditation Program

*****END OF REPORT*****